

REMARKS

Claims 4 and 6-120 are pending in this application. Claims 4, 9, 12, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 105, 111, and 116 are the independent claims.

Claims 4, 9, and 12 have been amended. Claims 13-120 are newly-presented. No new matter has been added.

Applicants gratefully acknowledge the courtesies extended by the Examiner in granting a personal interview on April 17, 2002. In that interview, Applicants' attorneys discussed various novel features of the present invention, the basis for the rejection set forth in the last Office Action, and various proposed claim amendments.

Claims 4 and 6-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,589,006 (Itoyama et al.) in view of U.S. Patent No. 5,470,657 (Hayami) and Applicants' Disclosure. This rejection is respectfully traversed.

In conventional building materials with solar cells affixed to backing materials thereof, electrical connectors are used to connect adjacent solar cells. In such conventional systems, vinyl chloride resins are used to insulate the conductive leads of the electrical connectors and asphalt, vinyl chloride, polyurethane and polystyrene materials are used as backing materials. As the space between the solar cells and the backing materials is often narrow, and the connections must be run on the back sides of the solar cells, the electrical connectors, as well as the insulated electrical leads, often contact the backing material. Over time, chemical reactions take place between the insulating resin and the backing material resulting in breaches (i.e., cracks) in the integrity of the resin insulators. Such breaches allow moisture to enter the solar cell via capillary action. Moisture in the solar cell, in turn, results in

electromigration which decreases the performance of the cell. For this reason, it is desirable to maintain the integrity of the jacket.

Independent Claims 4, 9, and 12

Independent Claim 4 recites features of a cladding assembly comprising a plurality of building materials each of which comprises a substrate and a solar cell unit fixed to the substrate on a backing material by a fixing member. Independent Claim 9 recites features of a method of installing a building material having a substrate and a solar cell unit fixed to the substrate on a backing material by a fixing member. Independent Claim 12 recites features of an air flowing apparatus which includes a building material having a substrate and a solar cell unit fixed to the substrate on a backing material by a fixing member. Each of independent Claims 4, 9, and 12 recite, *inter alia*,:

a jacket material of the electrical conductive leads is composed of at least one selected from the group consisting of polyethylene resins, polyamide resins, vinylidene fluoride resins, chloroprene rubber, ethylene-propylene rubber, silicone resins, and floureresins; and the backing material contains any one of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins . . .

. . . wherein the solubility parameter of the jacket material differs from the solubility parameter of the backing material so as to suppress deterioration of the conductive lead resulting from contact between said conductive lead and the backing material.

Independent Claims 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 106, 111, and 116

Independent Claims 16, 51, and 86 recite a jacket material composed of at least one polyamide resin and a backing material containing at least one of the group consisting of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, with associated dependent Claims 17-20, 52-55, and 87-90 reciting that the later material contains or more asphalt resins, a vinyl chloride resins, polystyrene resins, and polyurethane resins, respectively.

Independent Claims 21, 56, and 91 recite a jacket material composed of at least one vinylidene flouride resin and a backing material containing at least one of the group consisting of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, with associated dependent Claims 22-25. 57-60, and 92-95 reciting that the later material contains or more asphalt resins, a vinyl chloride resins, polystyrene resins, and polyurethane resins, respectively.

Independent Claims 26, 61, and 96 recite a jacket material composed of at least chloroprene rubber and a backing material containing at least one of the group consisting of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, with associated dependent Claims 27-30, 62-65, and 97-100 reciting that the later material contains or more asphalt resins, a vinyl chloride resins, polystyrene resins, and polyurethane resins, respectively.

Independent Claims 31, 66, and 101 recite a jacket material composed of at least ethylene-propylene rubber and a backing material containing at least one of the group consisting of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, with associated dependent Claims 31-35, 67-70, and 102-105 reciting that the later material contains or more asphalt resins, a vinyl chloride resins, polystyrene resins, and polyurethane resins, respectively.

Independent Claims 36, 71, and 106 recite a jacket material composed of at least one silicone resin and a backing material containing at least one of the group consisting of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, with associated dependent Claims 37-40, 72-75, and

107-110 reciting that the later material contains or more asphalt resins, a vinyl chloride resins, polystyrene resins, and polyurethane resins, respectively. Independent Claims 41, 76, and 111 recite a jacket material composed of at least one floureresin and a backing material containing at least one of the group consisting of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, with associated dependent Claims 42-45, 77-80, and 112-115 reciting that the later material contains or more asphalt resins, a vinyl chloride resins, polystyrene resins, and polyurethane resins, respectively. Independent Claims 46, 81, and 116 recite a jacket material composed of at least one polyethylene resin and a backing material containing at least one of the group consisting of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, with associated dependent Claims 47-50, 82-85, and 117-120 reciting that the later material contains or more asphalt resins, a vinyl chloride resins, polystyrene resins, and polyurethane resins, respectively.

Individual consideration of each of the claims in the preceding paragraph is respectfully requested.

Through these combinations of features, deterioration of the jacket due to the chemical reactions that take place over time when a jacketed electrical conductive lead is in contact the backing material can be prevented. Thus, the integrity of the jacket does not deteriorate over time due to chemical reaction. As a result, performance and durability of the solar cell are improved.

Applicants respectfully submit: (1) that there is no motivation to combine the cited art as proposed by the Office; (2) that the cited art fails to disclose or suggest at least the combination of the group of materials in the jacket material feature and the group of materials in the backing material feature wherein the solubility parameter of the jacket material differs from

the solubility parameter of the backing material so as to suppress deterioration of the conductive lead resulting from contact between said conductive lead and the backing material as recited in amended independent Claims 4, 9, and 12; and (3) that the asserted combination does not teach or suggest the combinations of backing materials and specific jacket materials recited in newly-presented independent Claims 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 106, 111, and 116, or the specific combinations of jacket and backing materials recited in the associated dependent claims. As a result, the cited art fails to achieve the aforesaid advantages.

Itoyama, et al. relates to a solar cell module and a passive solar heating system using the solar cell module. However, as the Office Action notes, Itoyama, et al. discloses or suggests neither: (1) a jacket material composed of at least one selected from the group consisting of polyethylene resins, polyamide resins, vinylidene fluoride resins, chloroprene rubber, ethylene-propylene rubber, silicone resins, and fluoroelastomers nor (2) a backing material containing any one of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins.

Recognizing these deficiencies in Itoyama, et al., the Office Action cited Hayami and to the knowledge supposedly available to one skilled in the art at the time the invention was made to provide the missing features.

The Hayami patent is directed to a heat resistant high voltage insulated lead wire for direct current and teaches an insulating layer comprising a polyolefin based resin formed over the conductor. The Office Action suggests that the claimed invention is obvious because Hayami supposedly teaches a polyethylene resin jacket and, regarding the absence in Itoyama, et al. of a teaching of the backing material feature, that it would have been obvious to one of ordinary skill

in the art to select the claimed backing materials from among available materials. Applicants respectfully disagree with these suggestions.

Initially, Applicants note that MPEP § 2142 requires, to establish a prima facie case of obviousness, that:

references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

Indeed, a rejection for obviousness is improper when there is nothing in the cited references, either singly or in combination, to suggest the desirability of the claimed subject matter. Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) (holding that “a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding'”) quoting C.R. Bard, Inc., v. M3 Systems, Inc., 48 USPQ2d 1225, 1232 (Fed. Cir. 1998); In re Dance, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) (holding that there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) (warning that “teachings of references can be combined only if there is some suggestion or incentive to do so.”). It is also well settled that when it is necessary to select elements of various teachings in order to form the claimed invention, there must be clear suggestion of motivation in the prior art to make the selection. See Interconnect Planning Corp. v. Feil, 227 USPQ 543, 551 (Fed. Cir. 1985).

Applicants first submit that there is no incentive, other than Applicants' disclosure, for combining the teachings of the prior art in the manner suggested in the Office Action. However, simply engaging in a hindsight reconstruction of the claimed invention, using Applicants' disclosure as a template and selecting elements from the citations, is an impermissible combination of the cited art. In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (holding that Federal Circuit case law is clear “that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.”); Interconnect Planning, 227 USPQ at 551. The references must provide some teaching whereby Applicants' combination would have been obvious. Applicants submit that such is not the case here. Rather, the Office has resorted to impermissible hindsight reconstruction in order to formulate the rejection under 35 U.S.C. §103. In re Deminski, 230 USPQ 313.

Here, neither Itoyama, et al. nor Hayami expressly or impliedly recognize that the durability of the jacket of an electrical conductive lead can be improved by using certain jacket materials and certain backing materials that do not chemically react when in contact. Thus, it is not surprising that neither of these patents expressly or impliedly suggest the claimed backing materials (asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins), in combination with the claimed jacket materials (polyethylene resins, polyamide resins, vinylidene fluoride resins, chloroprene rubber, ethylene-propylene rubber, silicone resins, and fluorochemical resins). Therefore, to establish a prima facie case of obviousness, the Office must present a convincing line of reasoning supporting the position that it would be obvious to one of ordinary skill in the art to select the claimed backing materials for use with the claimed jacket materials. See MPEP §2142.

In support of the suggestion that the claimed invention would have been obvious to one of ordinary skill in the art, the Office Action merely states that, regarding the claimed jacket materials, "it is held to be within the skill of a worker in the art to select a known material as a matter of design choice to provide superior protection of the electrical lead" and, regarding the claimed backing materials, that "it is held to be within the general skill of a worker in the art to select a suitable material according to the given parameters, in this case a load bearing, water and heat resistant material for supporting the solar cell." (Office Action, pages 2-3). Absent is any line of reasoning that one of ordinary skill in the art, in the absence of Applicants' disclosure, would have combined Hiyama 's insulator for a high-voltage direct current wire insulator of with passive solar heating system of Itoyama, et al. In short, there is nothing in the cited references, either singly or in combination, to suggest the desirability of the claimed subject matter. Therefore, the Office has not established a *prima facie* case of obviousness. See In re Lee, 61 USPQ2d 1430 (Fed. Cir. 2002) (holding that a rejection under 35 U.S.C. §103 must be based on specific evidence of record); In re Deminski, 230 USPQ 313 (a rejection for obviousness is improper when there is nothing in the cited references, either singly or in combination, to suggest the desirability of the claimed subject matter).

Applicants also submit that, even assuming *arguendo*, there exists a motivation or suggestion to combine the references as proposed by the Office, the asserted combination fails to disclose or suggest all of the features of either the amended independent claims or the newly-presented independent claims. In particular, the cited art does not teach or suggest, and the Office Action does not assert that the cited art teaches or suggests, "a jacket material of the electrical conductive leads is composed of at least one selected from the group consisting of polyethylene resins, polyamide resins, vinylidene fluoride resins, chloroprene rubber, ethylene-

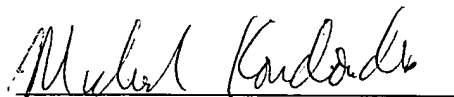
propylene rubber, silicone resins, and fluoro-resins; and the backing material contains any one of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins" and "wherein the solubility parameter of the jacket material differs from the solubility parameter of the backing material so as to suppress deterioration of the conductive lead resulting from contact between said conductive lead and the backing material," as recited by independent Claims 4, 9, and 12. Further, Applicant submits that the cited art also fails to disclose or suggest the features of newly-presented independent Claims 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 106, 111, and 116, or the specific combinations of jacket and backing materials recited in the associated dependent claims.

For the above reasons, Applicants submit that independent Claims 4, 9, 12, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 106, 111, and 116 are allowable over the cited art. Further, the dependent claims should also be allowable for the same reasons as the base claims and further due to the additional features that they recite. Individual consideration of each of the independent claims is respectfully solicited.

Applicants submit that the present application is in condition for allowance. Favorable consideration and an early Notice of Allowance are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

A handwritten signature in cursive script, reading "Michael Kondoudis", written over a horizontal line.

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APPENDIX

VERSION SHOWING CHANGES MADE TO THE CLAIMS

4. (Three Times Amended) A cladding assembly comprising:

a plurality of building materials each of which comprises a substrate and a solar cell unit fixed to the substrate, each of the plurality of building materials fixed on a backing material by a fixing member; and

electrical conductive leads arranged between the building materials and the backing material to contact the backing material, for leading output from the solar cell units to the outside,

wherein a jacket material of each of the electrical conductive leads is composed of at least one selected from the group consisting of polyethylene resins, polyamide resins, vinylidene fluoride resins, chloroprene rubber, ethylene-propylene rubber, silicone resins, and fluoro resins; and the backing material contains any one of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, [and]

wherein the substrate is composed of at least one selected from the group consisting of metals, resins and glass, and

wherein the solubility parameter of the jacket material differs from the solubility parameter of the backing material so as to suppress deterioration of the conductive lead resulting from contact between said conductive lead and the backing material.

9. (Three Times Amended) A method of installing a building material comprising the steps of:
- fixing a plurality of building materials each comprising a substrate and a solar cell unit fixed to the substrate on a backing material by a fixing member; and
 - arranging an electrical conductive lead between the corresponding building material and the backing material to bring the electrical conductive lead into contact with the backing material, for leading output from each of the solar cell units to the outside;
 - wherein a jacket material of the electrical conductive lead is composed of at least one selected from the group consisting of polyethylene resins, polyamide resins, vinylidene fluoride resins, chloroprene rubber, ethylene-propylene rubber, silicone resins, and fluoro-resins, and the backing material contains any one of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, [and]
 - wherein the substrate is composed of at least one selected from the group consisting of metals, resins and glass, and
 - wherein the solubility parameter of the jacket material differs from the solubility parameter of the backing material so as to suppress deterioration of the conductive lead resulting from contact between said conductive lead and the backing material.

12. (Three Times Amended) An air flowing apparatus comprising:

a building material which comprises a substrate and a solar cell unit fixed to the substrate and which is fixed to a backing material with a space therebetween so that outside air flows in the space, passes through the space and is entrapped in a house or discharged to the outdoors; and

an electrical conductive lead arranged between the building material and the backing material to contact the backing material, for leading output from the solar cell unit to the outside,

wherein a jacket material of the electrical conductive lead is composed of at least one selected from the group consisting of polyethylene resins, polyamide resins, vinylidene fluoride resins, chloroprene rubber, ethylene-propylene rubber, silicone resins, and fluoro resins, and the backing material contains any one of asphalt resins, vinyl chloride resins, polystyrene resins, and polyurethane resins, [and]

wherein the substrate is composed of at least one selected from the group consisting of metals, resins and glass, and

wherein the solubility parameter of the jacket material differs from the solubility parameter of the backing material so as to suppress deterioration of the conductive lead resulting from contact between said conductive lead and the backing material.